FACT SHEET
SAN GABRIEL RIVER METALS TMDL

California Regional Water Quality Control Board
Los Angeles Region
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The Los Angeles Regional Water Quality Control Board (Regional Board) and the United States Environmental Protection Agency (U.S. EPA) are developing a Total Maximum Daily Load (TMDL) to reduce metals in the San Gabriel River watershed (Figure 1). Segments of the San Gabriel River are on the 1998 and 2002 California 303(d) list of impaired waterbodies (Table 1).

Table 1. Waterbodies in the San Gabriel River watershed listed as impaired for metals

Impaired Reach	Copper	Lead	Selenium	Zinc
San Gabriel River Reach 2	X	X		X
Coyote Creek	X	X	X	X

The Clean Water Act (CWA) requires states to establish TMDLs for waters on the 303(d) list. A TMDL is the sum of the individual waste load allocations for point sources, load allocations for nonpoint sources, and natural background, such that the assimilative capacity of the waterbody (Loading Capacity) is not exceeded. U.S. EPA must approve the San Gabriel River Metals TMDL by March 22, 2007 pursuant to a consent decree. In order to facilitate State adoption prior to U.S. EPA approval, the Regional Board must adopt the TMDL in 2006.

The San Gabriel River Metals TMDL contains the following elements:

Problem Statement:

Metals loading to the San Gabriel River watershed results in impairments of beneficial uses associated with aquatic life and water supply. California Toxics Rule (CTR) criteria serve as the numeric water quality objectives for the Los Angeles Region and protect these beneficial uses. The 303(d) listings for San Gabriel Reach 1 and Coyote Creek are based on exceedances of CTR criteria in storm water data. Regional Board staff have confirmed wet-weather copper, lead, and zinc impairments in Coyote Creek and lead impairment in San Gabriel River Reach 1 and found additional dry-weather impairments due to copper in the Estuary and selenium in San Jose Creek Reach 1. TMDLs are proposed for the pollutant-water body combinations in Table 2.

Table 2. TMDLs required to address wet- and dry-weather impairments.

Dry-weather TMDLs	Copper	Lead	Zinc	Selenium
San Jose Creek Reach 1				x
Estuary	x			
Wet-weather TMDLs	**Copper**	**Lead**	**Zinc**	**Selenium**
San Gabriel River Reach 2		x		
Coyote Creek	x	x	x	

Numeric Targets:

Numeric targets for the TMDL are based on CTR criteria. Separate numeric targets are developed for dry and wet weather. The distinction between wet and dry weather is operationally defined as the 90th percentile flow and is separately defined for San Gabriel Reach 2 and Coyote Creek. The delineation in Reach 2 occurs when the maximum daily flow at USGS station 11085000 is 260 cfs. This station, located in Reach 3 above the Whittier Narrows Dam, is the best indicator of when wet-weather conditions are sufficient to result in storm water runoff to Reach 2. In Coyote Creek, the delineation occurs when the maximum daily flow at LACDPW flow gauge station F354-R, located at the bottom of the creek, is 156 cfs. Dry-weather numeric targets are based on chronic CTR criteria (Table 3) and wet weather numeric targets are based on acute CTR criteria (Table 4). Saltwater targets are developed for the Estuary and freshwater targets are developed for all other reaches. Freshwater numeric targets (except selenium) are adjusted for reach specific hardness using median hardness values. CTR default conversion factors are used to convert dissolved CTR criteria for copper, lead, and zinc into numeric targets expressed in terms of total recoverable metals.

Table 3. Dry-weather numeric targets expressed as µg/L total recoverable metals.

	Copper			Selenium		
Reach	Chronic Saltwater Criteria (µg/L dissolved)	CCF	Numeric Target (µg/L total)	Chronic Freshwater Criteria (µg/L total)	CCF	Numeric Target (µg/L total)
San Jose Creek Reach 1	--	--	**--**	5	--	5
San Gabriel River Estuary	3.1	0.83	3.7	--	--	--

Table 4. Wet-weather numeric targets expressed as µg/L total recoverable metals.

		Copper		Lead		Zinc	
Reach	Median Hardness (mg/L as $CaCO_3$)	ACF	Numeric Target (µg/L total)	ACF	Numeric Target (µg/L total)	ACF	Numeric Target (µg/L total)
San Gabriel Reach 2	175	--	**--**	0.71	**166**	--	--
Coyote Creek	105	0.96	**15**	0.78	**79**	0.98	**125**

Source Analysis:

During wet weather, flow is dominated by storm water runoff in the watershed. During dry weather, flows are significantly lower, with point source discharges, dry-weather urban runoff, and groundwater baseflow as the major sources. Water Reclamation Plants (WRPs) and storm drains both contribute metals loading in dry weather, but the dominant source of annual metals loading occurs in storm water runoff during wet weather. Two power plants are the dominant source of flow and metals loading in the Estuary. Both permitted and non-permitted sources of potential metals loading were identified. Nonpoint sources include open space sources and atmospheric deposition. Point sources include major and minor NPDES permits, general NPDES permits, and storm water permits (MS4, Caltrans, general construction, and general

industrial permits). A portion of the San Gabriel River watershed (upper Coyote Creek) is located in Orange County and is under the jurisdiction of the Santa Ana Regional Water Quality Control Board. Sources in Orange County were identified and will be assigned allocations in order to meet TMDLs.

Dry-Weather TMDLs and Allocations:

Dry-weather allocations are assigned to sources in San Jose Creek Reach 1 and Reach 2 to meet the selenium TMDL in Reach 1. Dry-weather allocations are assigned to sources in the Estuary, San Gabriel River Reach 1, and Coyote Creek to meet the copper TMDL in the Estuary.

The dry-weather loading capacity (TMDL) for San Jose Creek Reach 1 is calculated by multiplying the numeric target for selenium by the median non-WRP flow (19 cfs). Non-storm water point sources are assigned concentration-based waste load allocations equal to the numeric target. No value for atmospheric deposition of selenium is available; therefore, a load allocation of zero is assigned. The open space load allocation is the loading capacity multiplied by the percent of open space in the San Jose Creek subwatershed not served by storm drains (2%). The storm water waste load allocation (MS4s, Caltrans, General Industrial and Construction) is calculated by subtracting the load allocations from the loading capacity (Table 5).

The dry-weather loading capacity (TMDL) for the Estuary is calculated by multiplying the total volume of water in the Estuary at low tide (2.2 billion liters) by the saltwater copper target. Non-storm water point sources are assigned concentration-based targets; discharges directly to the Estuary (including the two power plants) receive a waste load allocation of 3.0 µg/L total copper and discharges to Reach 1 and Coyote Creek (including WRPs) receive a waste load allocation of 18 µg/L total copper. These allocations ensure that the numeric target for the Estuary is attained, given the relative flows of the direct and upstream sources, according to the following equation:

$$C_{Est} = \frac{C_{SGR}*Q_{SGR} + C_{PP}*Q_{PP}}{Q_{SGE}}$$

Where:

C_{Est} = Concentration in the Estuary
C_{SGR} = Concentration of upstream sources = 18 µg/L
Q_{SGR} = Upstream flow = 100 MGD
C_{PP} = Concentration of power plant discharge = 3.0 µg/L
Q_{PP} = Power plant flow = 2000 MGD
Q_{Est} = Combined power plant and upstream flow

Load allocations for direct atmospheric deposition to the Estuary, Reach 1, and Coyote Creek are extrapolated from previous studies in the Los Angeles River watershed based on their relative areas. Load allocations for open space are based the percent area of open space not served by storm drains in the Estuary, Reach 1, and Coyote Creek (0%).

Waste load allocations for storm water sources that drain to Reach 1 and Coyote Creek are equal to the concentration-based allocations assigned to upstream non-storm water discharges multiplied by the upstream median non-WRP flow (54 cfs).

The waste load allocation for the storm water permittees draining directly to the Estuary is calculated by subtracting the load allocations for nonpoint sources and the storm water waste load allocations for storm water sources draining to Coyote Creek and Reach 1 from the total loading capacity (Table 5).

Table 5. Dry-weather waste load and load allocations (total recoverable metals).

Reach	Non-storm water WLA (µg/L)	Loading Capacity (kg/day)	Direct Air Deposition WLA (kg/day)	Open Space WLA (kg/day)	Combined Storm water WLA (kg/day)
San Jose Reach 1 and Reach 2	5	0.23	0	0.005	0.228
Estuary	3.0	8.2	4.7×10^{-5}	0	5.9
San Gabriel Reach 1	18	--	2.3×10^{-4}	0	1.5
Coyote Creek	18	--	1.9×10^{-3}	0	0.84

The storm water waste load allocation is further allocated among types of storm water permits. A dry-weather waste load allocation equal to zero is assigned to the general industrial and construction storm water permits. The existing general permits already prohibit most dry-weather discharges. The entire dry-weather storm water waste load allocation is thus shared by the MS4 and Caltrans permits.

Wet-Weather TMDLs and Allocations:

Wet-weather loading capacities (TMDLs) are expressed as an equation, which multiplies daily storm volumes by wet-weather numeric targets. Separate wet-weather TMDLs are developed for San Gabriel Reach 2 and Coyote Creek (Table 6).

Table 6. Wet-weather loading capacities (TMDLs) for metals (total recoverable metals).

Reach	Copper (kg/day)	Lead (kg/day)	Zinc (kg/day)
San Gabriel Reach 2	--	Daily storm volume x 166 µg/L	--
Coyote Creek	Daily storm volume x 15 µg/L	Daily storm volume x 79 µg/L	Daily storm volume x 125 µg/L

Wet-weather allocations are assigned to all upstream reaches and tributaries of San Gabriel River Reach 2 and Coyote Creek because they drain to these impaired reaches during wet weather. Concentration-based WLAs equal to wet-weather numeric targets (Table 4) are established for non-storm water permits. Direct atmospheric deposition and open space load allocations are calculated by multiplying the loading capacity by the percent area of surface water and the percent area of open space not served by storm drains, respectively. Waste load allocations for storm water are calculated by subtracting these load allocations from the total loading capacity. For example, a flow of 260 cfs (daily storm volume = 6.4×10^8 liters) for San Gabriel Reach 2 and a flow of 156 cfs (daily storm volume = 3.8×10^8 liters) for Coyote Creek results in the waste load allocations presented in Table 7.

Table 7. Wet-weather allocations based on example daily flows (total recoverable metals).

Metal	Flow (cfs)	Daily Storm Volume (liters)	Loading Capacity (kg/day)	Open Space (kg/day)	Direct Air Deposition (kg/day)	Storm water permittees (kg/day)
San Gabriel Reach 2 and upstream reaches and tributaries						
Lead	260	$6.4x10^8$ liters	106	50	0.41	56
Coyote Creek and tributaries						
Copper	156	$3.8x10^8$ liters	5.7	0	0.012	5.7
Lead	156	$3.8x10^8$ liters	30	0	0.07	30
Zinc	156	$3.8x10^8$ liters	48.1	0	0.1	48

The combined storm water waste load allocation is further allocated to the general industrial, general construction, MS4 and Caltrans permits based on their percent area of the developed portion of the watershed (Table 6-14). The MS4 permittees and Caltrans share a waste load allocation because there is not enough data on the relative reach-specific extent of MS4 and Caltrans areas. For example, a flow of 260 cfs (daily storm volume = $6.4x10^8$ liters) for San Gabriel Reach 2 and a flow of 156 cfs (daily storm volume = $3.8x10^8$ liters) for Coyote Creek results in the waste load allocations presented in Table 8.

Table 8. Wet-weather waste load allocations for storm water permits based on example daily flows (total recoverable metals).

Metal	Flow (cfs)	Daily Storm Volume (liters)	General Construction (kg/day)	General Industrial (kg/day)	MS4 and Caltrans (kg/day)
San Gabriel Reach 2 and upstream reaches and tributaries					
Lead	260	$6.4x10^8$ liters	1.2	2.9	52
Coyote Creek and tributaries					
Copper	156	$3.8x10^8$ liters	0.29	0.20	5.2
Lead	156	$3.8x10^8$ liters	1.5	1.0	28
Zinc	156	$3.8x10^8$ liters	2.4	1.7	44

Each storm water permittee under the general industrial and construction storm water permits will receive an individual waste load allocations per acre based on the total acres of their facility.

Implementation Plan:

The proposed implementation plan would allow for separate implementation schedules for the different sources. The concentration-based waste load allocations for the non-storm water NPDES permits (including power plants and WRPs) would be translated into permit limits upon their issuance, renewal, or reopening. Compliance schedules of up to five years would be allowed for individual non-storm water permits. The general industrial and construction storm water permittees would achieve dry-weather waste load allocations at the time of permit issuance, renewal, or re-opener because dry-weather discharges are already restricted by the current general permits. For wet-weather, the general industrial storm would likely employ an iterative best management practice (BMP) process, including BMP effectiveness monitoring, to achieve compliance with interim waste load allocations within 4 years and final waste load

allocations within 9 years. It is proposed that the general construction storm water permittees would conduct BMP effectiveness studies within 6 years and would implement Regional Board approved BMPs within 8 years to meet their wet-weather allocations. The implementation schedules for the general industrial and construction storm water permittees are set to coincide with the implementation schedules specified in the Los Angeles River Metals TMDL. The proposed TMDL would require the MS4 and Caltrans storm water permittees to achieve their waste load allocations in prescribed percentages of the watershed, achieving dry-weather allocations in the entire watershed within 10 years and wet-weather allocations in the entire watershed within 15 years. It is proposed that a phased implementation approach, using a combination of non-structural and structural BMPs would be allowed to achieve compliance with the waste load allocations. The administrative record and the fact sheets for the MS4 and Caltrans storm water permits would be required to provide reasonable assurance that the BMPs selected would be sufficient to implement the waste load allocations.

Contact Information:

For more information, contact Jenny Newman at jnewman@waterboards.ca.gov or (213) 576-6691 or Melinda Becker at mbecker@waterboards.ca.gov or (213) 576-6622.